3GPP TSG RAN #4
Miami, USA, June 17-19 June 1999

TSG XX-(99)406

Agenda Item:

Source: TSG T WG1 Chairman

Title: LS to TSG RAN and SA about BER or FER based performance requirements

Document for: Discussion & Decision

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1. RATIONALE

TSG T WG1 has to define a measurement method for conformance testing of MS. At the moment in the specifications made by TSG RAN WG4 there does not exist any clear definitions or requirements regarding BER/FER in the Rx specification. TSG T WG 1 requests that both TSG RAN and TSG SA study this issue and define the minimum requirements, as this issue is related to the application areas (CODEC, etc.), layer 1 structure and bearer quality. Also a decision is needed on whether BER, FER or both shall be measured.

2. BACKGROUND

It is not mandatory for MS to send data with same bit rate in uplink as in the downlink. For example MS can receive 64 kbps in the downlink, but send only 8 kbps in uplink. This kind of situation is called the asymmetric traffic case. In order to make the testing method independent of the data rate between uplink and downlink, an internal BER/FER calculator has to be implemented in the MS [1]. The MS has to report the results on the uplink. Furthermore, a test for confirming the correct functionality of BER/FER calculator is needed. In the case of BER measurements, a bit sequence generator may be needed to compare received bits with ideal ones. Alternatively, test bit sequence has to be programmed into memory. In the FER case, bit sequence generators are not needed. The FER estimation could be done from 16 CRC bits. The duration of FER tests will however be longer than BER tests.

Furthermore there is still some ambiguity as to how these BER/FER measurements relate to system performance and at which level they apply. If the system under test includes the application (speech, data communication, etc.), the test method (FER/BER) may vary. SA is responsible for defining the required quality level of the bearer for the application, and RAN(WG1/WG4) is responsible for defining the specification for the physical layer necessary to guarantee it.

TSG T WG1 believes that a study within SA & RAN is essential for this definition.

3. REQUEST AND SUGGESTION

A decision is needed, whether BER or FER is better for testing MS performance. It should be taken into account, that this decision will have a impact on testing times, e.g. short duration (BER) test or the simple test interface implementation for (FER). When internal MS BER/FER calculator is implemented once, it can be copied to future mobile products. But if the test duration is long, then the overall conformance test time could be very long. As this system evolves, there is a tendency to create new tests and hence the test times will increase rapidly. Furthermore, the clear definitions and requirements for BER/FER are needed.

Similar issues are being discussed in SMG7 (GPRS/HSCSD) and 3GPP2 too. TSG T WG1 believes that there should be some consistancy with these decisions.

TSG WG1 would appreciate it if SA and RAN can define this clearly by the 29th July (the next T1/RF SWG meeting).

4. DETAILS

1) TSG T WG1 chairman requests SA to provide to RAN WG1/WG4 a clear definition of the required quality level (possibly expressed as BER or FER) for each application (e.g. speech, data communication, etc.).

2) TSG RAN WG1/ WG4 should then study the physical layer schemes and determine what level of bearer quality is required to guarantee the reliable operation of each application. RAN WG4 can then specify these requirements in terms of BER or FER.

3) TSG T WG1 requests that RAN WG4 develop a clear definition and specification for Rx testing in TS 25.101 and make it available by the above mentioned time frame.

5. REFERENCES

[1] TSGT1R#4(99)039: Method for testing data transmission functionality